CHARGE NUMBER: 4009

PROJECT TITLE: DEVELOPMENT SMOKE STUDIES

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PERIOD COVERED: SEPTEMBER, 1985

I. Project Slow

Objectives:

Develop the technology to reduce or mask objectionable odor of sidestream smoke.

Develop a subjectively acceptable cigarette with reduced sidestream visibility.

Status:

Flavor work, including distinctive flavors, is in progress for the 8.5 mg. tar flavor low model with drastically reduced sidestream. A model of this type with regular aftercut is currently under test with the O/C smoking panel. This test should give further guidance in the flavor work.

The full-flavor model, with the tar level currently at 11.5 mg., will be tested by the M/C smoking panel the week of October 14th.

Two tests of sensory evaluation and aerosol measurements of sidestream smoke were completed this month. In both, the Flavor Development sidestream smoke panel evaluated the sidestream odor of cigarettes in the standard test (7 descriptors, 10 point scale, paired comparison format), followed by aerosol measurements with the TSI Piezobalance.

The first test dealt with extruded rod cigarettes without wrapper and with standard KC 137-1 and Ec 18145 low sidestream MgO wrapper. While the odor test did not show any significant differences between the tested cigarettes, the aerosol measurements of the unwrapped rod gave much higher values. The low sidestream wrapper compared to the standard wrapper gave the expected 40-50% reduction in sidestream aerosol concentration.

In the second test, four cigarettes made with wrappers containing graded levels of MgO at two basis weights were evaluated. The results showed the lowest level of sidestream aerosol concentration for the wrappers with 12% MgO. In the case of the 45 g/m^2 basis weight wrapper the low sidestream aerosol concentration was due to a true decrease in sidestream delivery, while for the 25 g/m^2 wrapper the effect was due to the combination of a smaller decrease in sidestream delivery and a significant decrease in static burn rate. The sensory evaluation showed, surprisingly, higher ratings in harshness for the model with the lowest aerosol concentration, the one made with 45 g/m^2 wrapper.

Both sensory tests point to a high contribution of the wrapper to sidestream smoke odor, higher than the weight ratio wrapper to filler would suggest, and higher than previously thought.

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II. Computer Applications

Objective:

To write programs in BASIC and provide user assistance for the directorate at O/C.

Results:

Several changes have been made to DELIVERY, the smoke delivery analysis and data-base program. In particular, a NEWS feature has been added to keep users informed of modifications for error corrections and additional features. Several small bugs have been eliminated and modifications added to enhance the entry of text notes for individual cigarette samples. A new command also allows the user to delete sections of a data storage file from the program rather than using an editor.

III. Wrapper Modifications

Objective:

To evaluate modified wrappers for slow burning characteristics.

Results:

Analysis is in progress of data for repeated measurements of thirteen samples for which both Greiner and Coresta porosity measurements were made. Samples ranged from 3 Greiner seconds to 90 seconds. Preliminary results show that among the several curves examined a LOG-LOG functional form best fits the data. A literature search is in progress to learn what other functional forms have been tried in the past.

IV. Data Collection Automation

The IBM PC-XT has been received and successfully linked to the Mettler balance. Software is being developed to measure the rate of weight loss of burning cigarettes.

An automated test station has been completed by our Engineering Group to test other cigarette burn properties. Software modifications are in progress for this station to automate data collection.

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